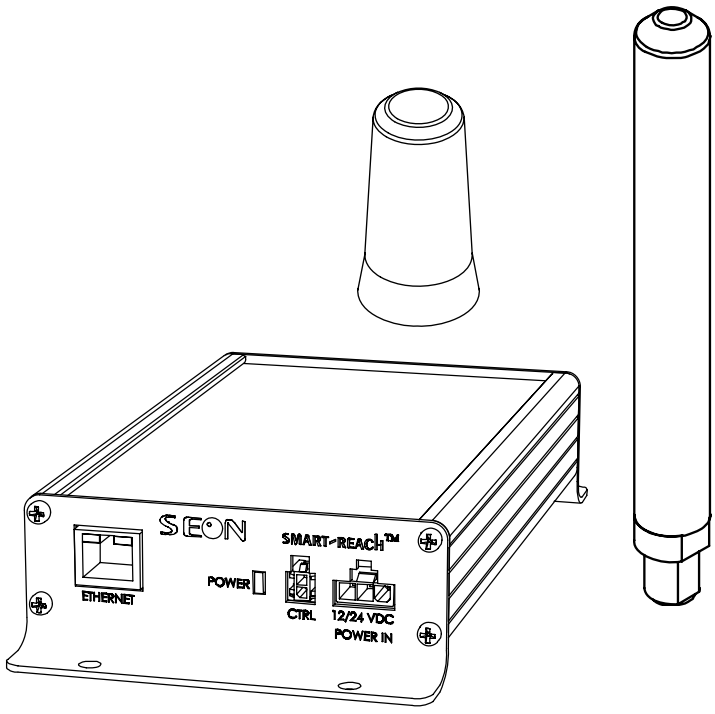
SEON
Mobile Surveillance

Smart-Reach™ Wireless Link

Installation and Configuration Guide



700-0055 R001

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Who This Guide is For

This *Installation and Configuration Guide* provides explanations and procedures for installing, configuring, maintaining, and troubleshooting the Smart-Reach Wireless Link.

The Guide is intended for users who are installing or configuring the Smart-Reach Wireless Link. Installers should be qualified electricians with data communication experience. Contact Seon Design for assistance with identifying qualified contractors in your area.

A qualified IT administrator will be required to provide information and/or set up the configuration parameters in Chapter 3, “Network Configuration”.

Conventions Used

WARNING

Warnings identify conditions or practices that could result in personal injury or loss of life.

CAUTION

Cautions identify conditions or practices that could result in damage to the unit or other equipment.

Important: These notes describe things which are important for you to know, but are not as serious as a Caution.

Symbols Used

The following symbols are used in this guide or on a product label.

Symbol	Explanation
⚠	Warning or Caution
⏚	Earth (ground) terminal

Abbreviations and Acronyms

Acronym	Definition
IEEE	Institute of Electrical and Electronics Engineers
LAN	Local Area Network
MAC Address	Media Access Control address
SSID	Security Set Identifier
SMA-RP	SubMiniature version A, Reverse Polarity
WI-FI	Wireless Fidelity
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Network
WPA	Wi-Fi Protected Access

Related Documentation

Refer to the following related documentation.

Document Name	Document Part Number
Explorer™ EX8 Plus Mobile Digital Video Recording (DVR) System, Installation and User's Guide	700-0048
Explorer™ EX4 Basic and Plus Mobile Digital Video Recording (DVR) System, Installation and User's Guide	700-0042
Explorer™ Mobile Digital Video Recording System: DVR Remote Viewer, Quick Reference Guide	700-0056

Finding Information Online

You can find more information about Seon Design Inc. as well as its products and services at **www.seon.com**.

Contents

Chapter 1 Introduction

1.1. About the Smart-Reach Wireless Network - - -

Chapter 4 Maintenance and Troubleshooting

4.1. Updating the Software Program ---------- 4–2
4.2. Hardware and Connection Setup ---------- 4–2
4.2.1. DB-9 to RS-232 Asynchronous ---------- 4–2
4.2.2. 4-Pin Molex AUX connector (RS-232) Asynchronous ---------- 4–3
4.2.3. 8-Pin RJ-45 Ethernet Connector ---------- 4–3

Appendix A Specifications

A.1. Smart-Reach Wireless Link ---------- A–2
A.2. Antenna ---------- A–3
A.2.1. WLAN Mobile Antenna Specifications ---------- A–3
A.2.2. WLAN Terminal Antenna Specifications ---------- A–3
A.2.3. N-Male to N-Female Bulkhead 90 V Lightning Protector ---------- A–4

SEON DESIGN® INC. PRODUCT WARRANTY

DISCLAIMER ---------- W–2
Provisions Applicable to American Customers ---------- W–3
Provisions Applicable to Canadian Customers ---------- W–3

Tables

Table 2-1 WLAN mobile antenna location requirements - 2–4
Table 2-2 Smart-Reach front panel features - 2–7
Table 2-3 Smart-Reach back panel features - 2–9
Table 3-1 Terminal emulator program settings - 3–6
Table 3-2 Basic Setup menu items - 3–11
Table 3-3 Wireless Setup menu - 3–13
Table 3-4 Bridge Setup menu - 3–15
Table 3-5 Basic Setup Configuration settings- 3–16
Table 3-6 Wireless Setup Configuration settings - 3–16
Table 3-7 Bridge Setup Configuration settings - 3–16
Table 4-1 DB-9 Pinouts - 4–2
Table 4-2 AUX Pinouts - 4–3
Table 4-3 RJ-45 Pinouts - 4–3

Figures

Figure 1-1 Smart-Reach wireless network - - -

CHAPTER 1

Introduction

This chapter describes the product features and components of the Smart-Reach™ wireless network.

The Smart-Reach wireless network is for use with the Explorer series of Mobile Digital Video Recording (DVR) Systems from Seon Design, which includes the EX4 and EX8 family of products.

1.1. About the Smart-Reach Wireless Network

What is a Smart-Reach wireless network?

The Smart-Reach wireless LAN (local area network) is a communication system designed for mobile applications.

In a standard Smart-Reach wireless network, as shown in Figure 1-1, a Smart-Reach vehicle station and a small mobile antenna are installed onboard a vehicle with an Explorer DVR. Another Smart-Reach unit is located in the office with a terminal antenna to create the base station. The base station is the connection point that ties wireless communication devices into a network.

Using this system, the surveillance footage on the DVRs can be accessed by a qualified user from the base station while the vehicle is in the yard.

The Smart-Reach wireless network is based on the IEEE 802.11b and 802.11g wireless standards to provide a secure, high-speed connection. Password protection and wireless encryption help to ensure that all communication can only be accessed by authorized personnel.

Customizing the Smart-Reach network

The Smart-Reach network has the robustness to service a fleet of one vehicle or several vehicles. A variety of antennas are available depending on your application and site requirements.

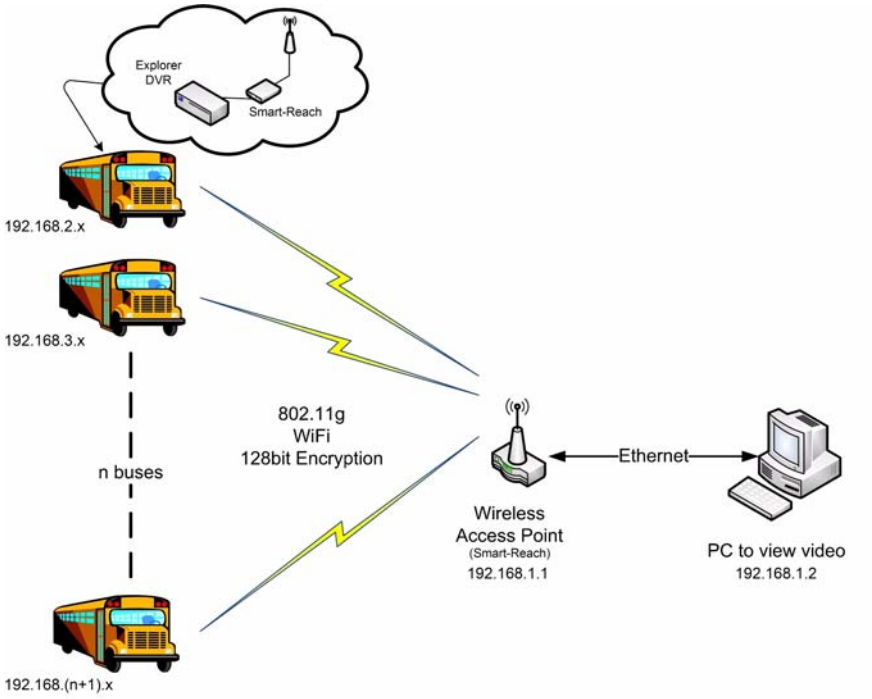

Figure 1-1 Smart-Reach wireless network

1.2. Smart-Reach Product Features

The Smart-Reach wireless network has been designed using extremely reliable and easy-to-use technology, including:

- Wireless DVR access that provides a high-speed connection to Explorer DVRs.
- Proven technology using the IEEE 802.11b and 802.11g wireless LAN standard (2.4 GHz frequency).
- Remote DVR access of live and recorded video footage using DVR Remote Viewer, a Web-based program using the Internet Explorer® Web browser.
- Two wireless operating modes as a vehicle station or base station.
- Compact enclosure allows the Smart-Reach to be installed close to the antenna, improving signal quality and range.
- Different antennas are available to accommodate different vehicles.
- Robust design engineered for operating reliability in harsh environments:
  - Operating temperature range of –40°F to 158°F (–40°C to 70°C).
  - Power input range of 10 to 32 VDC.
- Field upgradeable software uses a standard USB memory device for Smart-Reach.

CHAPTER 2

Installation

This chapter provides information and procedures for installing the Smart-Reach wireless local area network (WLAN). The steps include installing:

- the Smart-Reach and WLAN mobile antenna onboard a vehicle.
- the Smart-Reach and WLAN terminal antenna at the base station.

2.1. Installing the Smart-Reach Wireless LAN

When planning the installation of the Smart-Reach wireless network, select a dry indoor location for the Smart-Reach unit where the unit is not exposed to moisture. Install the Smart-Reach within proximity of the antenna, which is designed to be mounted in an outdoor location.

In a standard network, as shown in Figure 2-1, the Smart-Reach vehicle station is installed onboard the vehicle within three feet of the mobile antenna for optimum signal performance. The Smart-Reach base station is installed in the yard office with a terminal antenna.

Important: Installers should be qualified electricians with data communications experience. If you need assistance with identifying qualified contractors in your area, please contact Seon Design for more information.

Before beginning the installation, assemble all the necessary system components and inspect the units for any scratches or damage. Use the appropriate tools for the installation.

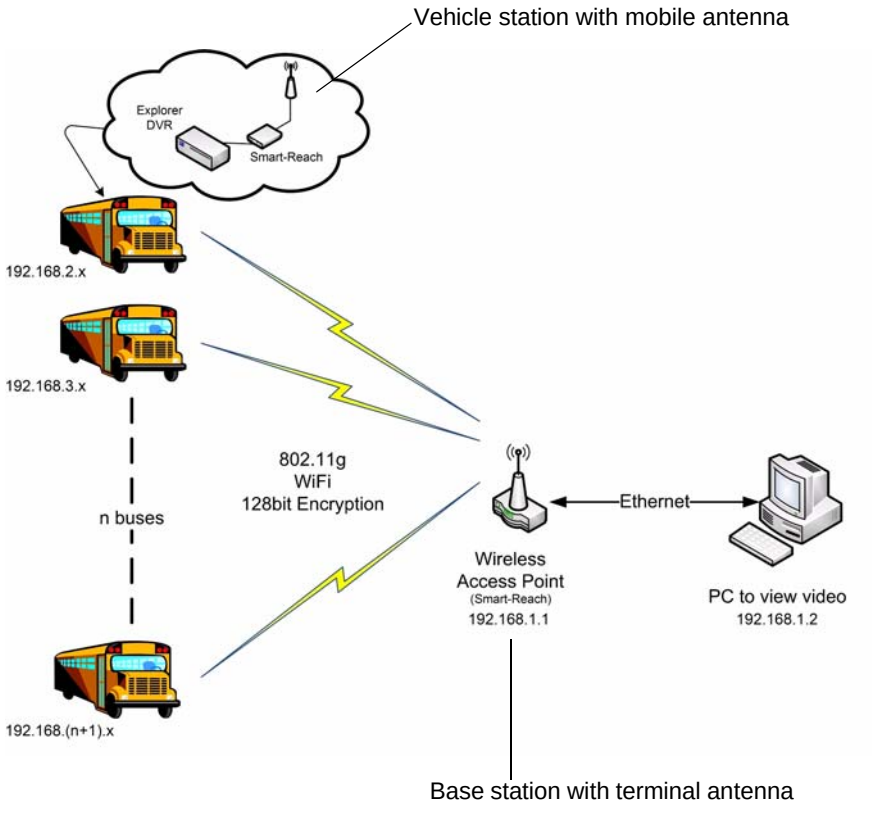

Figure 2-1 Smart-Reach wireless network: Vehicle and base stations

2.2. Installation Materials

The following materials are required to complete the installation of the Smart-Reach wireless LAN.

2.2.1. Smart-Reach Vehicle Installation Kit

The Smart-Reach vehicle installation kit includes the following materials:

- Smart-Reach vehicle station
- Power harness (20 ft)
- Control harness (20 ft)
- Ethernet cable, CAT5e (20 ft)
- Fuse 1 A
- Fuse holder (in-line)
- Butt splice connector, 14–16 AWG on both ends
- Four #10 × ¾ sheet metal screws
- Four #10 × ¾ self drilling screws
- Four #10 external lock washers

2.2.2. WLAN Mobile Antenna Kit

For specifications, see “WLAN Mobile Antenna Specifications” on page A–3.

The installation kit includes the following materials:

- Antenna, 2 dBi, 1.5" × 3.5", white
- Mounting hardware
- Coaxial cable SMA-RP NMOHF, RG-58 (3.28 ft)

2.2.3. Smart-Reach Base Station Installation Kit

Two Ethernet CAT5e cables are required for installing the Smart-Reach base station and are available by contacting your sales representative at Seon Design or from any computer store. Purchase the length required for your installation.

The following materials are included in the installation kit:

- Smart-Reach base station
- Smart-Reach 110 V power adapter
- Coaxial cable SMA-RP plug, RG-58 (6.5 ft)
- Lightning protector, N-Male to N-Female (For specifications, see page A–4.)
- Ethernet CAT5e cross-over adapter, RJ-45F to RJ-45F
- Four #10 × ¾ sheet metal screws
- Four #10 × ¾ self drilling screws
- Four #10 external lock washers

2.2.4. WLAN Terminal Antenna Kit

For specifications, see “WLAN Terminal Antenna Specifications” on page A–3.

The following materials are included in the installation kit:

- Antenna, 6 dBi radome omni, 12.25"
- L mount bracket

2.3. Installing the Smart-Reach Vehicle Station and Antenna

The Smart-Reach vehicle station is clearly labelled and is meant to be installed on the vehicle. The vehicle station is configured before the product is shipped to the customer. To change the configuration, see Chapter 3, “Network Configuration”.

The WLAN mobile antenna is installed on the roof of the vehicle. The antenna is provided with a coaxial cable to connect to the Smart-Reach. For optimum signal reception, use the antenna cable provided with the Smart-Reach. Longer cables can be obtained; however, a longer antenna cable results in a weaker signal strength, which means a shorter wireless range, similar to voltage losses which occur on long transmission lines.

2.3.1. Step 1: Choosing a Location for the WLAN Mobile Antenna

The location of the antenna will affect the performance of the wireless network. Install the antenna in a outdoor location that meets the requirements described in Table 2-1:

Table 2-1 WLAN mobile antenna location requirements

Location requirement	Description
Close to the Smart-Reach vehicle station on the vehicle.	The transmitting antenna must be within 3 feet (1 meter) of the Smart-Reach unit on the vehicle.
Requires 3 feet (1 meter) of clearance from other antennas.	The WLAN mobile antenna must have 3 feet (1 meter) of clearance from any other antenna on the vehicle, such as a GPS antenna or a radio antenna used for onboard communication.
Requires a clear line-of-sight view.	The onboard antenna requires a clear line-of-sight view to the receiving antenna in the base station. The antenna cannot be obstructed.

Important: Microwave ovens and cordless phones, for example, and other wireless networks use the same 2.4 GHz frequency band as Smart-Reach. When too many devices are being used simultaneously, signal interference can occur and affect performance.

2.3.2. Step 2: Installing the Mounting Assembly for the Antenna

The following procedure summarizes the mounting assembly installation. For complete identification of parts and an illustrated procedure, see the product documentation that is included with the Radiall/Larsen WLAN mobile LPT 2400 NMOHFW antenna.

To install the mounting assembly:

1. Drill a ¾" hole on a flat and metallic surface of the vehicle.

   A fiberglass surface is less than optimal for installing the mounting assembly. If the vehicle skin is not metal, Seon Design will provide a ground plane, which is tin-plated copper. Contact Seon Design for more information.

2. Metal-to-metal contact between the vehicle and the mount will provide the best performance. Remove any burrs on the under side of the hole.

3. Screw the locking nut onto the mounting assembly, and twist the nut one-and-a-half turns. Feed the coax cable and the serrated part of the mounting assembly through the hole, going from the bottom to topside of the hole.

4. Pull up on the locking nut, and place the mounting step into proper alignment in the hole. Continue pulling the locking nut upwards and tighten the nut until it is finger tight. Check that the O ring between the locking nut and mounting assembly is seated properly.

5. Holding the mounting assembly with a spanner wrench or long nose pliers, use an adjustable or open end wrench on the locking nut and tighten firmly (60 in-lbs. or 6.8 Nm maximum). Do not overtighten.

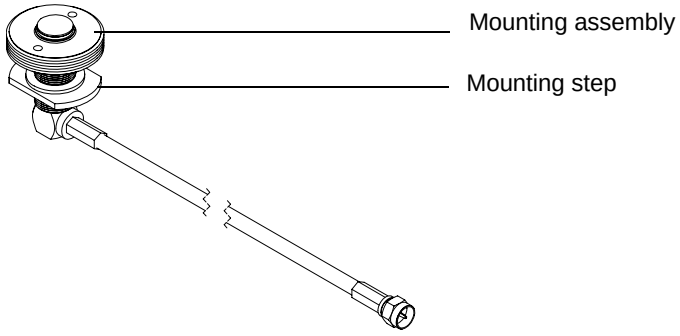

Figure 2-2 Mounting assembly

2.3.3. Step 3: Mounting the WLAN Mobile Antenna

To mount the WLAN mobile antenna:

1. Place the required gasket on the base of the antenna.
2. Align the antenna threads with the threads of the base and turn slowly.
3. Stop turning when the antenna feels snug on the base. Do not overtighten.

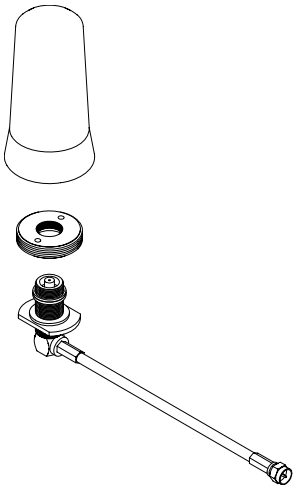

Figure 2-3 Stacking order on the mounting assembly

2.3.4. Step 4: Mounting the Smart-Reach

The typical mounting location for the Smart-Reach vehicle station will be inside a vehicle's electrical panel or header panel, within three feet of the antenna.

CAUTION: Equipment damage
Smart-Reach is rated for indoor use only and must be mounted in a dry location. Do not expose the Smart-Reach to moisture.

The Smart-Reach unit can be installed in any orientation as long as the front and back panel connections are accessible. Four mounting points are located on the flanges for securing the unit.

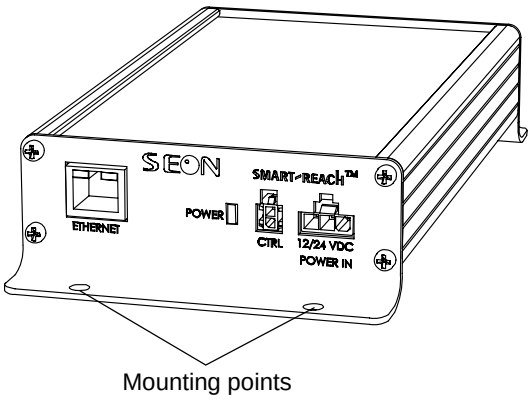

Figure 2-4 Smart-Reach mounting points

To install the Smart-Reach:

1. Use the four #10 × ¾ sheet metal screws or the #10 × ¾ self drilling screws and #10 external lock washers to secure the Smart-Reach to the surface.

2.3.5. Step 5: Connecting to the Smart-Reach Front Panel

The Smart-Reach front panel provides the following connections and indicator light, as shown in Figure 2-5.

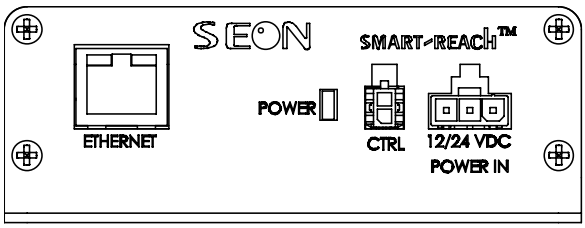

Figure 2-5 Smart-Reach front panel

Table 2-2 Smart-Reach front panel features

Item	Feature	Description
1	ETHERNET	The ETHERNET RJ-45 connector is used to connect to the DVR.
2	POWER	The POWER indicator (green) illuminates when the Smart-Reach is powered on.
3	CTRL	The 2-pin control connector is for connecting the Smart-Reach-to-DVR control harness.
4	12/24 VDC POWER IN	The 3-pin POWER IN connector is for connecting the Smart-Reach to the electrical panel of the vehicle.

To connect the CAT5e cable to the front panel:

1. Connect one end of the 20 ft CAT5e cable to the Ethernet RJ-45 connector.
2. Connect the other end of the cable to the ETHERNET connector on the DVR.

To customize your installation, longer Ethernet cables are available by contacting your sales representative at Seon Design.

To connect the power harness to the vehicle's electrical panel:

Power is supplied from the vehicle and not from the DVR. The power harness uses the supplied 1 A fuse with the in-line automative fuse holder to protect the red positive (+) battery wire.

1. Connect the black negative (–) battery power wire to the vehicle's electrical panel.
2. Strip the red wire end appropriately. Use the supplied butt splice connector to connect the fuse holder to the red battery power wire. Connect the other end of the fuse holder directly to the vehicle's electrical panel.
3. The in-line fuse holder consists of a black plastic piece with an attached cap that simply pulls apart. Install the 1 A fuse and push the holder back together.
4. Connect the POWER IN harness to the 12/24 VDC POWER IN connector.

To customize your installation, longer power harness cables are available by contacting your sales representative at Seon Design.

To connect the 2-pin control connector:

1. Connect the 2-pin connector to the CTRL connector on the Smart-Reach.
2. Connect the 2-pin connector to the CONTROL connector on the DVR or on the Smart-Link module.

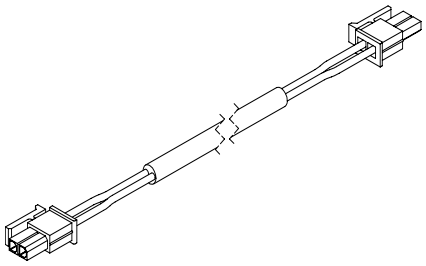

Figure 2-6 Control connector 2-pin Molex

Powering the Smart-Reach

Smart-Reach powers on when the Record Delay-On Time of the DVR[1] is over, and the DVR powers up the cameras and Smart-Reach.

When the Power Delay-Off Time[2] is over, the DVR and Smart-Reach power down.

To customize your installation, longer control signal cables are available by contacting your sales representative at Seon Design.

2.3.6. Step 6: Connecting to the Smart-Reach Back Panel

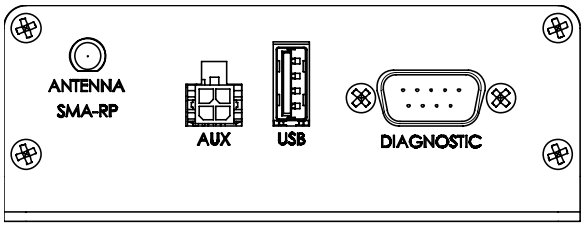

Figure 2-7 Smart-Reach back panel

Table 2-3 Smart-Reach back panel features

Item	Feature	Description
1	ANTENNA SMA-RP	The ANTENNA SMA-RP provides the connection for a coaxial cable from the antenna to the Smart-Reach.
2	AUX	The AUX connector is for Seon Design use only.
3	USB	The USB port supports USB devices for upgrading the Smart-Reach software.
4	DIAGNOSTIC	The DB-9 serial port is for diagnostic purposes only.

1. Connect the coaxial cable from the antenna to the ANTENNA SMA-RP connection on the back panel of the Smart-Reach.
2. Hand tighten the ANTENNA SMA-RP connection. The specified torque spec is 3–5 in-lbs (0.34–0.57 Nm). Do not overtighten.

1. Record Delay-On Time determines when the DVR system will start up. Record Delay-on Time is a configurable setting with values ranging from 0 seconds to 60 minutes. For more information on this feature, see the *Installation and User's Guide* of the DVR.

2. Power Delay-Off Time keeps power and control signal to the DVR only after the vehicle ignition is turned off to allow a remote connection to access the DVR's video. Power Delay-Off Time is a configurable setting with values ranging from 0 minutes to 255 minutes. For more information on this feature, see the *Installation and User's Guide* of the DVR.

2.4. Installing the Smart-Reach Base Station and Antenna

The Smart-Reach base station is clearly labelled and is meant to be installed in the yard office. The base station is configured before the product is shipped to the customer. To change the configuration, see Chapter 3, “Network Configuration”.

2.4.1. Step 1: Choosing a Location for the Base Station Antenna

The base station antenna is supplied with an L mount bracket and a lightning protector. (For more information on the base station antenna and lightning protector, see Appendix A, “Specifications”.)

WARNING: Shock hazard

Check with the local electrical code requirements for the proper installation and grounding of the lightning protector. Seon Design Inc. is not responsible for improper installation of the lightning protector and does not provide protection against lightning strikes.

To install the base station antenna:

1. Secure the L mount bracket to the desired location on the outside of the building.
2. Insert the antenna into the bracket and secure with the washer and nut, as shown in Figure 2-8.

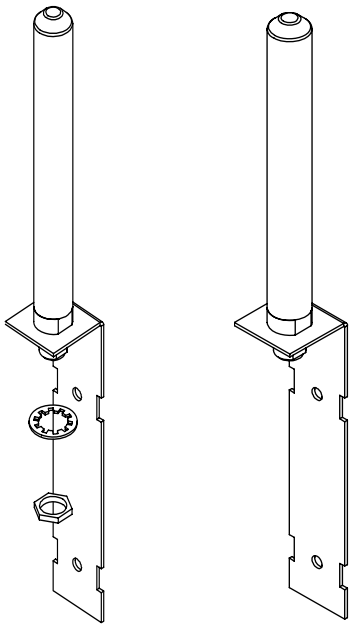

Figure 2-8 Installing the base station antenna on the bracket

3. Attach the lightning protector, as shown in Figure 2-2.

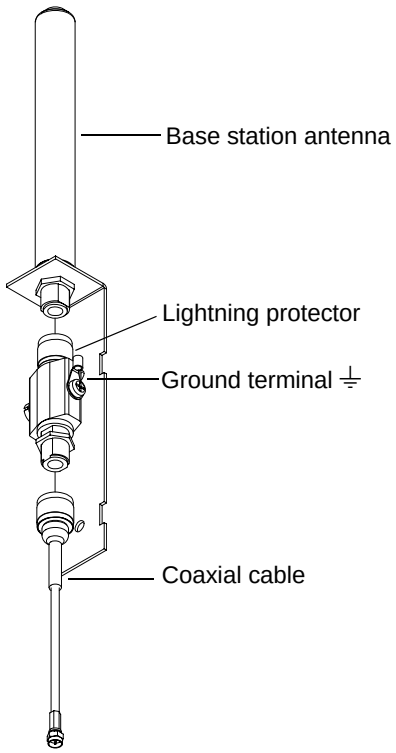

Figure 2-9 Attaching lighting protector and antenna cable

4. Use 12 AWG stranded wire (recommended) to connect the ground terminal ⏚ on the lightning protector to a pipe in the ground.
5. Connect the SMA-RP connector on the coaxial cable, as shown in Figure 2-10, to the ANTENNA SMA-RP connector on the Smart-Reach.
6. Connect the other end of the cable to the lightning protector, as shown in Figure 2-9. Tighten to a torque spec of 6–10 in-lbs (0.68–1.13 Nm). Do not overtighten.

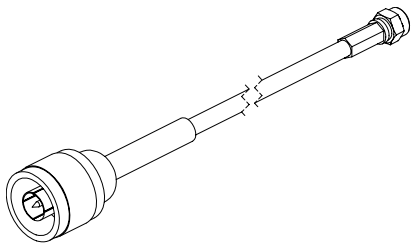

Figure 2-10 SMA RP coaxial cable

2.4.2. Step 2: Mounting the Smart-Reach

Mount the Smart-Reach in a dry location as described in “Step 4: Mounting the Smart-Reach” on page 2–6.

2.4.3. Step 3: Connecting to the Smart-Reach Front Panel

1. Connect the Ethernet cable on the Smart-Reach to a computer using two CAT5e cables and the supplied cross-over adapter.

   The cross-over adapter uses normal CAT5 cable in the installation.
2. Connect the AC power adapter to the 12/24 VDC POWER IN connector.

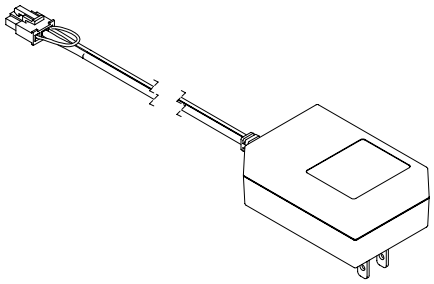

Figure 2-11 Smart-Reach power adapter

3. Connect the AC power adapter to a 110 VAC source.

This configuration does not require a control cable.

CHAPTER 3

Network Configuration

This chapter provides information and procedures for planning and configuring the Smart-Reach wireless local area network (WLAN). The steps include:

- setting up the computer
- setting up the DVR
- configuring the Smart-Reach unit as a vehicle station (bridge) or a base station (access point)

3.1. Setting up the Smart-Reach Wireless Network

A qualified IT administrator will be required to provide network information.

3.1.1. Network Topologies

The wireless network configuration involves multiple vehicles. Each vehicle will have a WLAN mobile antenna and a Smart-Reach vehicle station installed onboard. Another Smart-Reach unit will be installed in the yard office and serves as the base station.

3.1.2. System Requirements

A computer with the following minimum requirements is required:

- a serial port
- a terminal program such as HyperTerminal for Windows 2000/XP or Tera Term for Windows

3.1.3. Configuring the TCP/IP Settings on the Computer

In order to set up the network, configure the TCP/IP settings on the computer and set up the network menu on the DVR. A qualified IT administrator will be required to provide information about the network.

To set up the TCP/IP settings on a computer running Windows 2000/XP:

1. Click on **Start**. In Control Panel, click **Network and Internet Connections**.

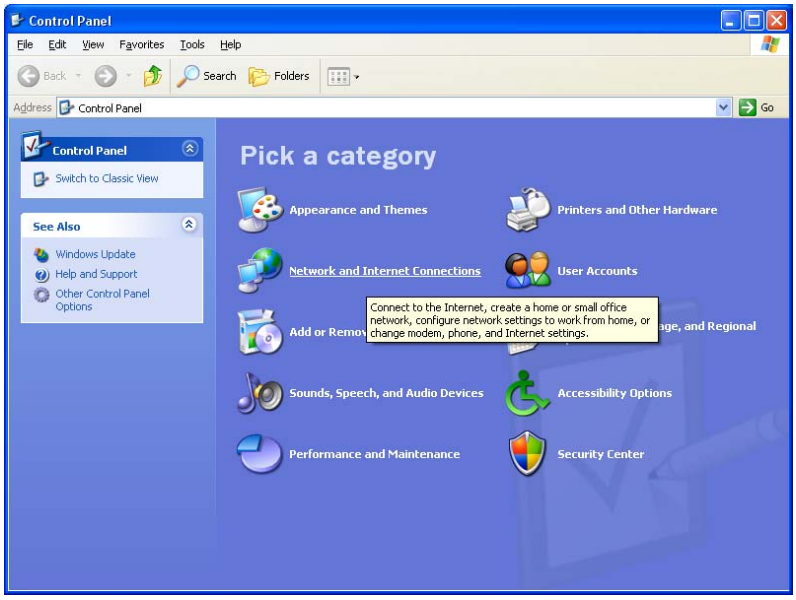
Control Panel
File Edit View Favorites Tools Help
Back Search Folders
Address Control Panel Go
Control Panel
Switch to Classic View
See Also
Windows Update
Help and Support
Other Control Panel Options
Pick a category
Appearance and Themes
Printers and Other Hardware
Network and Internet Connections
User Accounts
Connect to the Internet, create a home or small office network, configure network settings to work from home, or change modem, phone, and Internet settings.
Sounds, Speech, and Audio Devices
Accessibility Options
Performance and Maintenance
Security Center

Figure 3-1 Network and Internet Connections window

Figure 3-2 appears.

2. Click **Network Connections**.

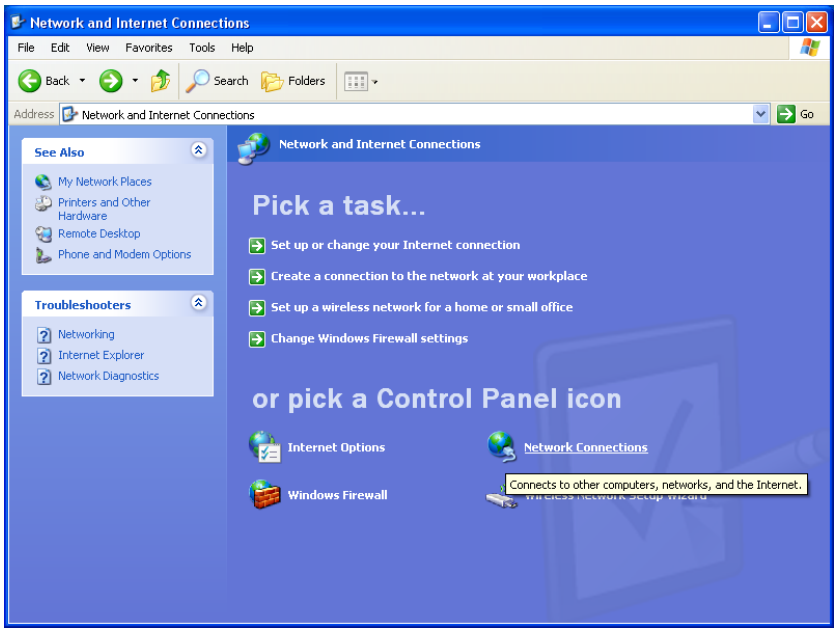

Figure 3-2 Network Connections window

Figure 3-3 appears.

3. Click on Local Area Connection.

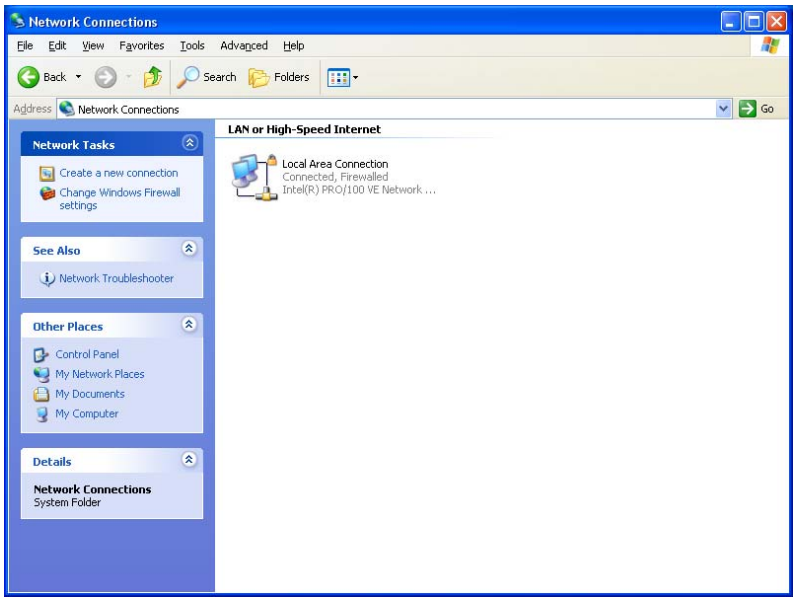

Figure 3-3 Network Connections window

4. Under Network Tasks, click Change settings of this connection or right-click to display Properties.

   Figure 3-4 appears.

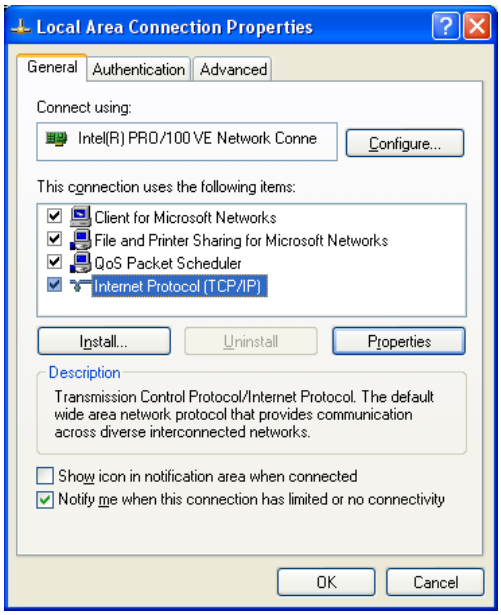

Figure 3-4 Local Area Connection Properties window

5. Under the General tab, click on Internet Protocol (TCP/IP), and click Properties.

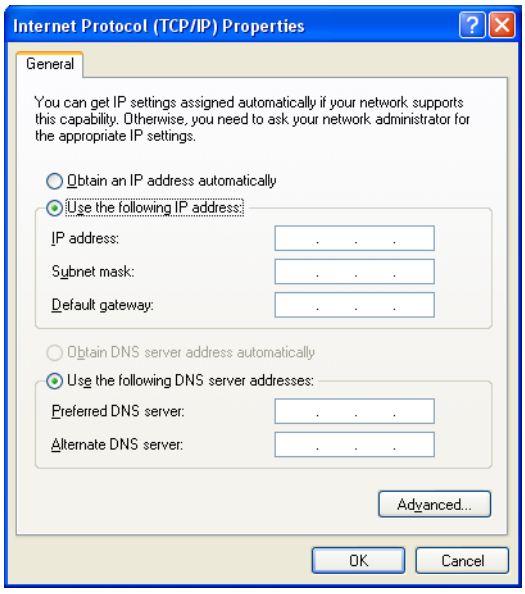
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 3-5 Internet Protocol (TCP/IP) Properties

6. Click **Use the following IP address**.
7. In IP address, enter the IP address (typical 192.168.1.2).
8. In Subnet mask, enter the Subnet mask for the network (typical 255.255.0.0.).
9. In Default gateway, enter the IP address of the router or gateway on the LAN.
10. Click **Use the following DNS server addresses**, and enter the IP address of the DNS server on the network.
11. Click **OK**.

3.1.4. Setting up the Network Settings on the DVR

The Explorer DVRs have a built-in network interface for connecting to an office network or to certain peripheral devices.

Use the Network menu in the main menu to set the communication parameters, such as an IP address, Subnet mask, and gateway IP.

To configure the network settings on the DVR, see using the Network menu in the *Installation and User's Guide* of your DVR.

3.1.5. Configuring the Smart-Reach

The Smart-Reach unit is configured at the factory to serve as a vehicle station or as a base station. If the settings need to be reconfigured, see "Using the Smart-Reach Network Software" on page 3–8.

3.2. Configuring the Terminal Program

A terminal program like HyperTerminal or Tera Term (a free open source terminal program) communicates with the Smart-Reach unit through the serial port. Use the appropriate terminal program for your Windows operating system.

To set up HyperTerminal:

1. Click on **Start**> **All**> **Programs**> **Accessories**> **Communications**> **HyperTerminal**.

   The New Connection window appears.
2. Type a name for the connection.
3. Click **OK**.
4. In the Com Port properties window, enter the standard settings for the terminal emulator program described in Table 3-1.

Table 3-1 Terminal emulator program settings

Item	Program settings
Terminal type	VT100
Baud rate	115200
Data bits	8 bit
Parity	None
Stop bits	1 bit
Flow control	None

To set up Tera Term:

1. If you choose to use the Tera Term program, you can download it from http://www.neocom.ca. Follow the on-screen instructions for installing onto the computer.
2. Double click on the Tera Term icon to open the program.
3. In the File menu, click New Connection.

   Figure 3-6 appears.

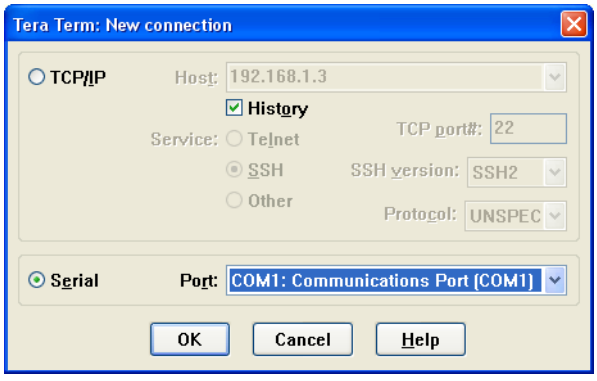

Figure 3-6 Tera Term: New connection window

4. Select Serial, set the Port to COM1 (or to the COM port that will be used).
5. Click **OK**.
6. In the Setup menu, select Terminal.

   Figure 3-7 appears.

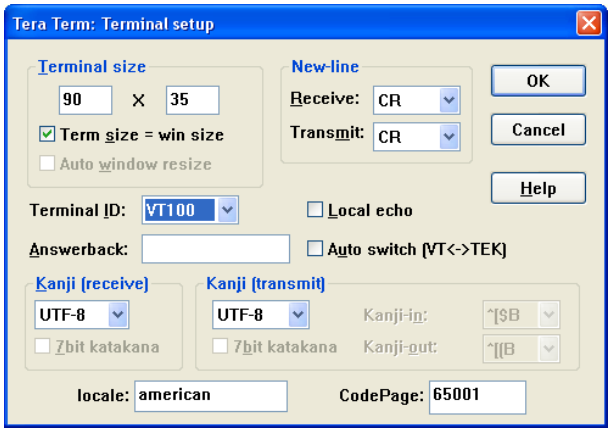

Figure 3-7 Tera Term: Terminal setup window

7. Set the Terminal ID to VT100. Click **OK**.
8. In the Setup menu, select Serial Port.

   Figure 3-8 appears.

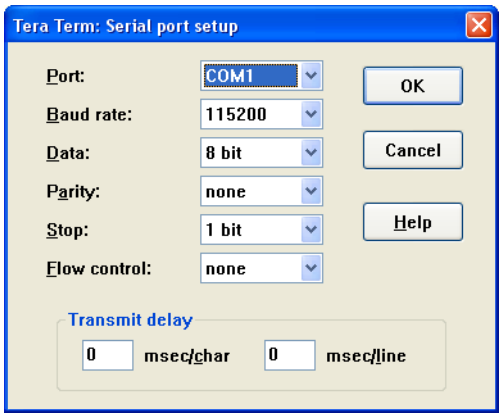

Figure 3-8 Tera Term: Serial port setup window

9. Enter the standard settings for the serial port, as shown in Figure 3-8.
10. Click **OK**.

3.3. Using the Smart-Reach Network Software

Use the Smart-Reach software to configure the unit for the different operating modes as a vehicle station or as a base station.

The network menu appears as shown in Figure 3-9.

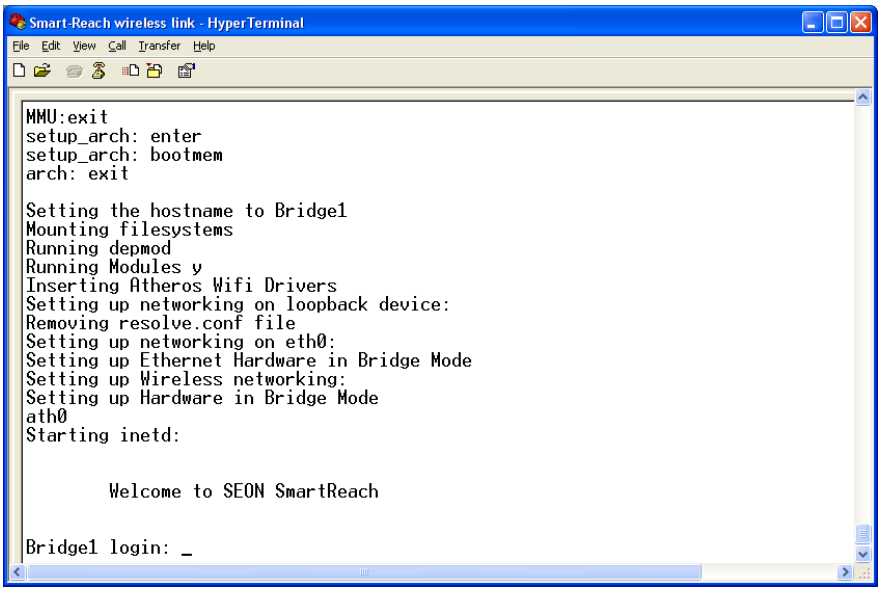

Figure 3-9 Welcome to Smart Reach window

To log on to Seon Smart-Reach:

1. Enter the login username: admin (default).
2. Press Enter.
3. Enter the password: admin (default).
4. Press Enter.

   The Smart-Reach main menu appears as shown in Figure 3-10.

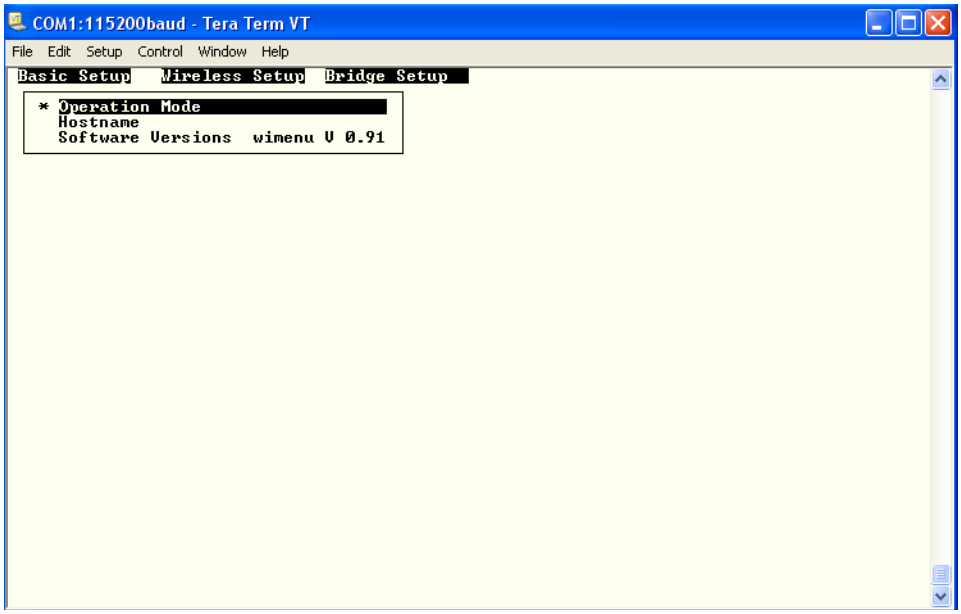
COM1:115200baud - Tera Term VT
File Edit Setup Control Window Help
Basic Setup Wireless Setup Bridge Setup
* Operation Mode
Hostname
Software Versions wimenu V 0.91

Figure 3-10 Smart-Reach main menu

The menu has three sub menus:

- Basic Setup
- Wireless Setup
- Bridge Setup

5. Use the left and right arrow keys on your keyboard to move between the three menu items. Use the up arrow and down arrow keys to move between the sub-menu items.

   The flashing cursor and asterisk indicate which menu item is active.

6. Press Enter to select the highlighted item.

Important: Pressing the Escape key on the keyboard will close and restart the Smart-Reach software program. Press Enter to select menu items. The exception is the Software Versions menu—exit by pressing the Escape key.

3.3.1. Using the Basic Setup Menu

Under the Basic Setup menu, select from the menu items which are described in Table 3-2:

- Operation Mode for Vehicle or Base.

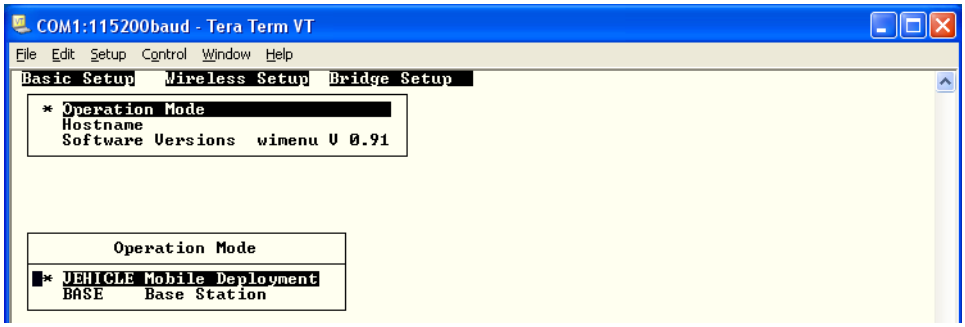

Figure 3-11 Basic Setup menu–Operation Mode

- Hostname

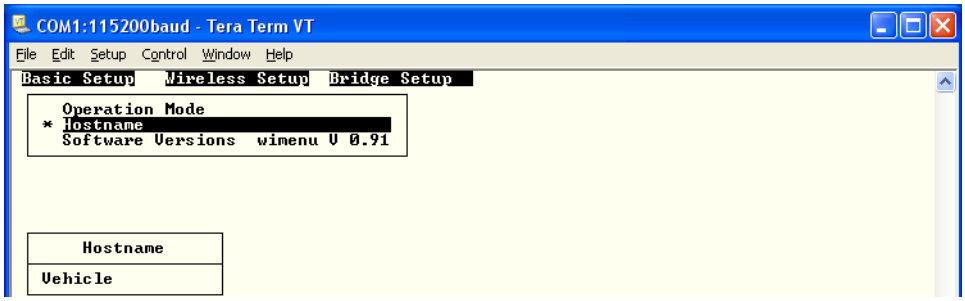

Figure 3-12 Basic Setup menu–Hostname

- Software Versions wimenu V 0.91

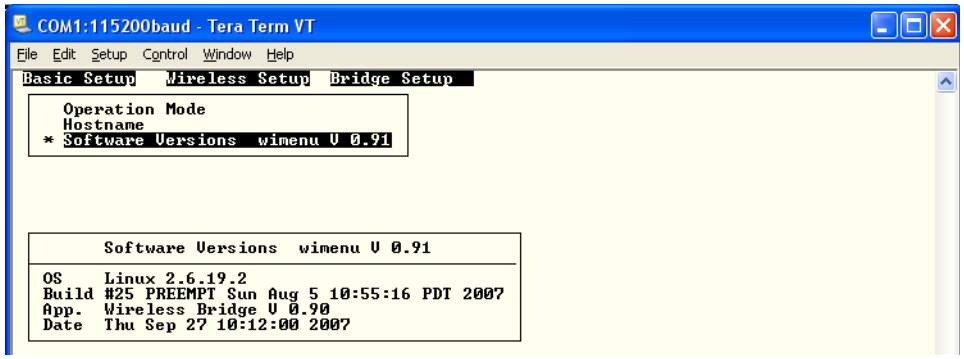
COM1:115200baud - Tera Term VT
File Edit Setup Control Window Help
Basic Setup Wireless Setup Bridge Setup
Operation Mode
Hostname
* Software Versions wimenu V 0.91
Software Versions wimenu V 0.91
OS Linux 2.6.19.2
Build #25 PREEMPT Sun Aug 5 10:55:16 PDT 2007
App. Wireless Bridge V 0.90
Date Thu Sep 27 10:12:00 2007

Figure 3-13 Basic Setup menu–Software Versions

Table 3-2 Basic Setup menu items

Item	Description
Operation Mode	VEHICLE (Mobile Deployment) Configured as a wireless station.
	BASE (Base Station) Configured as a wireless access point.
Hostname	Enter a name to identify the device. For example, Vehicle (default name is Mobile) or Base (default name).
Software Versions	Identifies the software version. To exit the Software Versions window, press the Escape key.

3.3.2. Using the Wireless Setup Menu

Set the configuration parameters for the wireless bridge in the Wireless Setup menu. Under the Wireless Setup menu, select from the menu items which are described in Table 3-3.

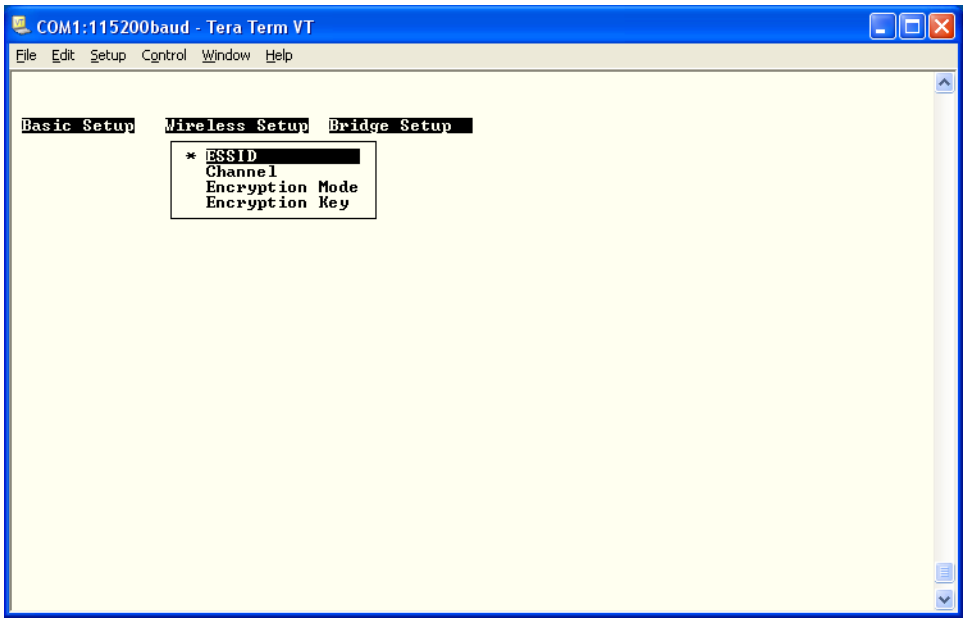

Figure 3-14 Wireless Setup menu

The configuration parameters include:

- ESSID

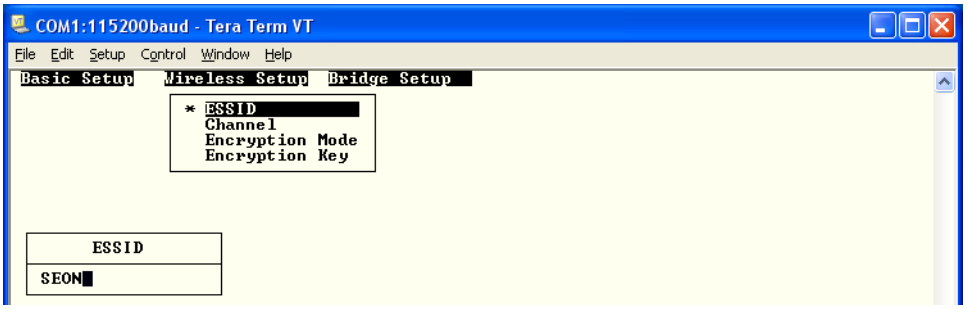

Figure 3-15 Wireless Setup menu–ESSID

- Channel

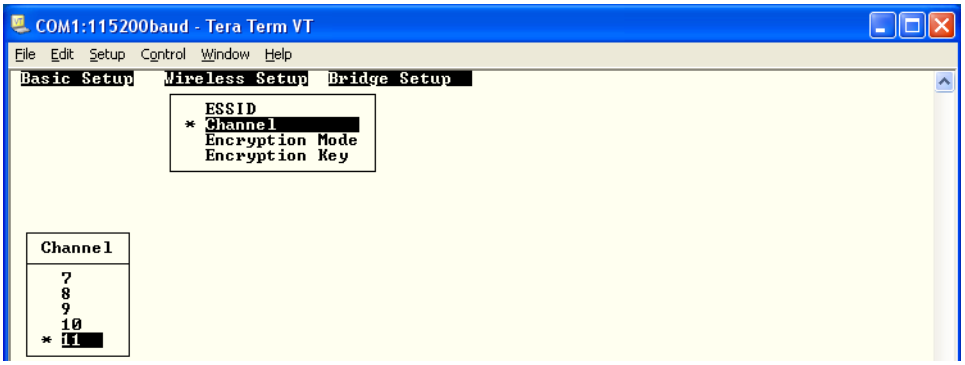

Figure 3-16 Wireless Setup menu–Channel

- Encryption Mode

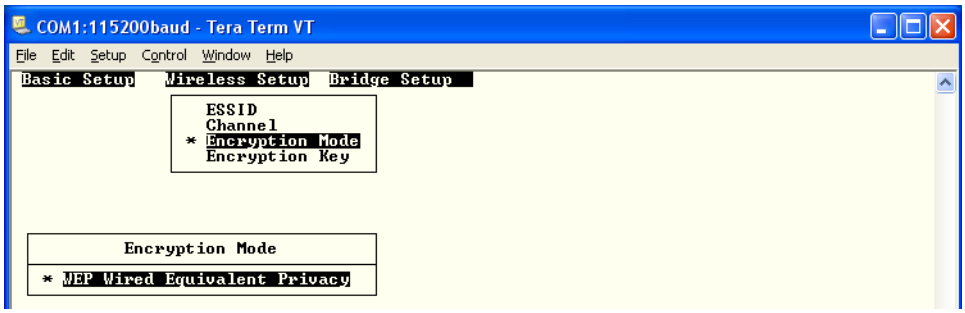

Figure 3-17 Wireless Setup menu– Encryption Mode

- Encryption Key

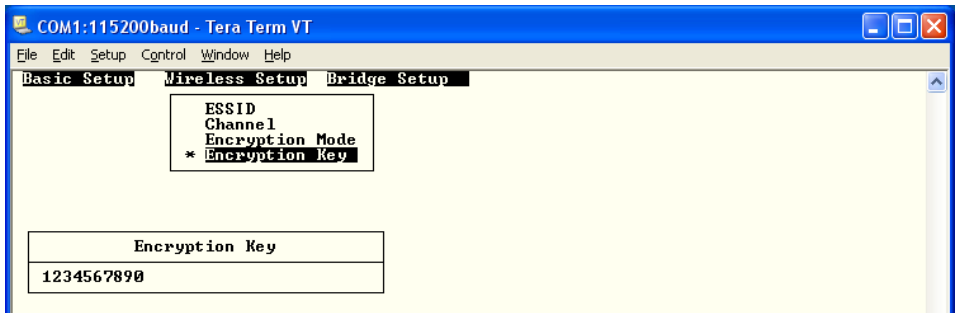

Figure 3-18 Wireless Setup menu–Encryption Key

Table 3-3 Wireless Setup menu

Wireless Setup	Description
ESSID	ESSID (Extended Service Set Identifier) is the ID or name of a wireless LAN which includes an access point. The ESSID must be identical for all units on the wireless network.
Channel	Channel selection ranges from 1 to 11. Select the channel which will be the operating radio channel. Channel 11 is the default.
Encryption Mode	Encryption Mode uses WEP (Wired Encryption Privacy). (WPA encryption will be available in the future.)
Encryption Key	Enter a 10-digit security encryption key.

3.3.3. Using the Bridge Setup

Set the configuration parameters for the bridge connection in the Bridge Setup menu. Under the Bridge Setup menu, select from the menu items which are described in Table 3-4.

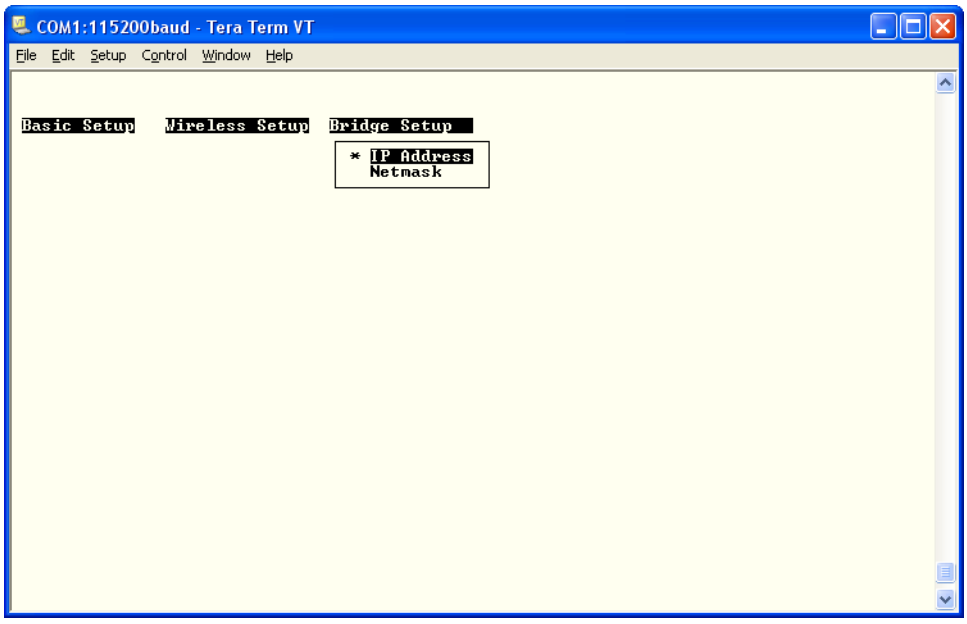

Figure 3-19 Bridge Setup menu

- IP Address

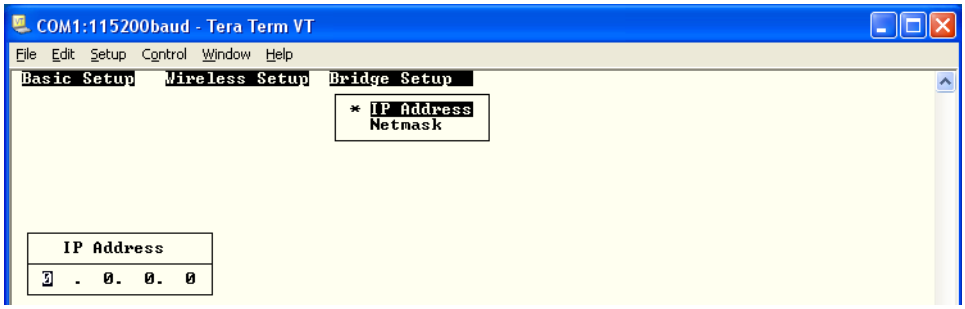

Figure 3-20 Bridge Setup menu–IP Address

- Netmask

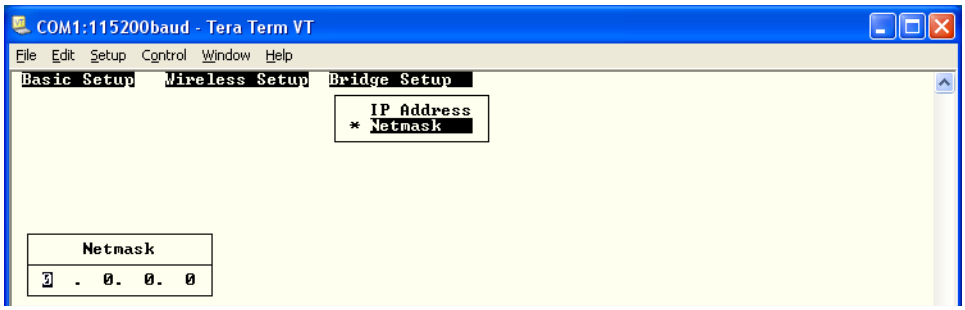

Figure 3-21 Bridge Setup menu–Network

Table 3-4 Bridge Setup menu

Ethernet Setup	Description
IP Address	The DHCP server is not available. Enter a static IP address for the Smart-Reach unit.
Netmask	Enter the network mask 255.255.0.0.

3.3.4. Configuration Settings

The configurations settings for the Smart-Reach network software are provided in the following tables. The tables show the original configuration setting for each menu item. Enter any changes you make to the settings in the Your Changes column.

Table 3-5 Basic Setup Configuration settings

Basic Setup	Original Setting	Your Changes
Operation Mode	VEHICLE Mobile Deployment	
	BASE Base Station	
Hostname	Vehicle	
Software Versions (not changeable)		

Table 3-6 Wireless Setup Configuration settings

Wireless Setup	Original Setting	Your Changes
ESSID	SEON	
Channel	11	
Encryption Mode	WEP Wired Equivalent Privacy (not changeable)	
Encryption Key	1234567890	

Table 3-7 Bridge Setup Configuration settings

Bridge Setup	Original Setting	Your Changes
IP Address		
Netmask	255.255.0.0.	

CHAPTER 4

Maintenance and Troubleshooting

This chapter describes how to maintain and troubleshoot the Smart-Reach wireless link.

4.1. Updating the Software Program

The software update must be obtained from Seon Design. Attempting to load other software will not work on the Smart-Reach wireless link.

To install a software update, a USB memory device must be formatted from a Windows computer using the FAT file format. Load the updated program onto the USB memory device.

To install a software program update to the Smart-Reach:

1. Insert a USB memory device with the new software version into the USB port.
2. Power up the Smart-Reach using the vehicle ignition.

   The update procedure takes approximately 15 minutes.

Important: Do not turn the vehicle ignition off during the software update.

4.2. Hardware and Connection Setup

This section provides pinout information for the Diagnostic DB-9 serial port, AUX connector, and RJ-45 Ethernet connector.

4.2.1. DB-9 to RS-232 Asynchronous

Communication control cable with DB-9 Female to DB-9 Female asynchronous serial null modem cable. The cable length should be 10 feet.

Table 4-1 DB-9 Pinouts

Pin	Name	Description
1	N/C	No Connection
2	RX	Receive Data
3	TX	Transmit Data
4	N/C	No Connection
5	GND	Ground
6	N/C	No Connection
7	N/C	No Connection
8	N/C	No Connection
9	N/C	No Connection

4.2.2. 4-Pin Molex AUX connector (RS-232) Asynchronous

The AUX connector is for Seon Design use only.

Table 4-2 AUX Pinouts

Pin	Name	Description
1	N/C	No Connection
2	TX	Transmit Data
3	RX	Receive Data
4	GND	Ground

4.2.3. 8-Pin RJ-45 Ethernet Connector

Table 4-3 RJ-45 Pinouts

Pin	Name	Description
1		Transmit Positive
2		Transmit Negative
3		Receive Positive
4	N/C	No Connection
5	N/C	No Connection
6		Receive Negative
7	N/C	No Connection
8	N/C	No connection

Appendix A

Specifications

This appendix provides the product specifications for the Smart-Reach wireless link and the antennas.

Note: Specifications are subject to change without notice.

A.1. Smart-Reach Wireless Link

Wireless Specifications

IEEE Standard	IEEE Std. 802.11b (2.4 GHz) IEEE Std. 802.11g (2.4 GHz)
Output power	600 mW
Encryption	WEP (Wired Equivalent Privacy)
	WPA (Wi-Fi Protected Access) Currently not available

Wireless Operational Modes

Base Station	Non-mobile connection point
Vehicle Station	Used on mobile platform, allows access from any wireless device (such as a laptop with a wireless card)

Interface Specifications

Power Input	3-pin: Ground, +Vbat, Control (+ input to activate)
Control Input	2-pin connector: Ground, control
Ethernet	RJ-45 connector, 10/100 Base T auto negotiation interface
Serial Console Port	DB-9 (male) for software update and diagnostics
USB	Host port for software updates
Antenna Connection	Reverse polarity SMA connector for 2.4 GHz

Environmental and Mechanical

Operating Temperature	–40°F to 158°F (–40°C to 70°C)
Storage Temperature	–40°F to 185°F (–40°C to 85°C)
Operating Humidity	0 to 95% relative humidity, non-condensing
Dimensions (H × W × D)	1.4 × 4.1 × 7.9" (35 × 103 × 200 mm)
Weight	0.88 lb (400 g)

Power Requirements

Power Input	10–32 VDC
Power Consumption	5 W (approximate)
Input Protection	Reverse polarity protection with in-line diode
Fuse	Requires external 1 A fuse (fast blow)

A.2. Antenna

A.2.1. WLAN Mobile Antenna Specifications

WLAN Mobile Antenna (LPT Low profile/Transit antenna)	Larsen® 2.4–2.5 GHz
Gain	20 dBi
Type	Low profile
VSWR (voltage standing wave ratio)	< 2.0:1
Power rating	10 W
Color	White
Base size	1.5"
Maximum height	3.5"
Coaxial cable	SMA RP NMOHF, RG-58, 3.28 ft

A.2.2. WLAN Terminal Antenna Specifications

WLAN Terminal antenna	Larsen® 2.4–2.5 MHz
Gain	6 dBi
Type	Radome omni
VSWR (voltage standing wave ratio)	1.5 maximum
Impedance	50 Ohm
Radiation pattern	Vertical plane: 30° typical
	Horizontal plane: Omni-directional
Cross polarization	Vertical plane: > 23 dB
	Horizontal plane: > 23 dB
Maximum input power	20 W
Operating temperature	–40° to 131°F (–40° to 55°C)
Ingress protection	IP67
Radome enclosure	Acrylonitrile Styrene Acrylate
Maximum length	12.25"

A.2.3. N-Male to N-Female Bulkhead 90 V Lightning Protector

Lightning protector	Altelicon™, Multi-strike capability, Bi-directional protection

Electrical Specifications

Frequency range	0–3 GHz
Protector complies with	IEC/IEEE Standard
VSWR (voltage standing wave ratio)	1:1.3 maximum (0–3 GHz)
Insertion loss	0.4 dB maximum (0–3 GHz)
Impedance	50 Ohm
Standard gas tube element	90 V ±20%
Gas tube insulation resistance	10,000 MΩ
Maximum withstand current	5 kA

Mechanical Specifications

Connector types	N-Male to N-Female bulkhead
Connector body material	Nickel plated brass
Body material	Aluminum
Pin material	Gold plated brass
O-ring material	Rubber
Ground lug	10 AWG maximum 12 AWG stranded copper wire recommended
Dimensions (H × W × D)	1.6 × 0.8 × 3.3" (40 × 20 × 84 mm)
Weight	3.17 oz (89.8 g)

SEON DESIGN® INC. PRODUCT WARRANTY

Seon Design Inc. (Seon) warrants the cameras and components listed below against defects in workmanship and materials provided that such defects appear or are discovered within the respective periods specified below and provided further that the purchaser of such products notifies Seon of such defects within thirty (30) days of the appearance or discovery of such defects:

- Five (5) years from date of purchase parts and labor on the SA Wedge Camera Series
- One (1) year from date of purchase parts and labor on the SA-IR Illuminator
- One (1) year from date of purchase parts and labor on the Explorer™ Mobile DVR Systems
- One (1) year from date of purchase parts and labor on all other products and accessories

All service/replacement parts and repairs are warranted for a period of 90 days.

Subject to the terms and conditions listed below, during the relevant warranty period, Seon will repair, replace, or refund the purchase price for the defective product, whichever Seon considers to be appropriate in the circumstances, in Seon's sole and arbitrary opinion, free of charge, any defective products returned prepaid. In the event purchaser has a problem with any Seon product, please call and request a **RETURN AUTHORIZATION (RA) NUMBER** from the Service Department.

Please call 877-630-7366 or (604) 941-0880 and ask for the Service Department. Be sure to have the model number, serial number and the nature of the problem available for the customer service representative. Prior authorization **MUST** be obtained for all returns, exchanges, or credits. **ITEMS SHIPPED TO SEON WITHOUT A CLEARLY IDENTIFIED RA NUMBER MAY BE REFUSED.**

Products returned will be tested to verify the defect. Upon verification of the defect, the product will be repaired or exchanged, or the purchase price will be refunded or credited to the customer's account, at the sole option of Seon. In the event of replacement, the returned product will be credited to the customer's account and a new invoice issued for the replacement item. Seon reserves the right to refund the purchase price or to issue a credit only in lieu of replacement.

Seon may use new or refurbished replacement parts for repairing its products, at its sole and arbitrary discretion. Seon may replace an entire unit with an equivalent model, at its sole and arbitrary discretion. If a unit is exchanged, the returned product shall become the property of Seon and the exchange product becomes the property of the purchaser, and the remainder of the warranty that applied to the original unit purchased shall apply to the exchanged product. Exchange units may be new units or units that have been repaired to full factory specifications at Seon's discretion.

If the product is found to be in good working order or its inability to function properly is not covered by this warranty, the product will be returned in the same condition as received unless repair is possible and requested by the customer. Repairs of such nature will incur a charge for parts and labor and will proceed only by agreement with the customer to accept the charge.

This warranty shall not apply:

(a) to equipment not supplied by Seon;

(b) to equipment, including, any components, which shall have been operated in excess of rated capacity, subject to negligence, accident, or damage by circumstances beyond Seon's control, or to improper installation, operation, maintenance, servicing, alterations or storage, modification without Seon's written authorization, misuse, vandalism, fire, floods or acts of nature so as, in Seon's exclusive and arbitrary judgment, to affect the same adversely; or

(c) if the serial number for the product has been altered in any way.

(d) if the product has been operated outside of the specified Operating Environment specified in the Seon Users Manual for such product.

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Provisions Applicable to American Customers

For those customers whose mailing address is in the United States, Seon's offer and any agreement of sale resulting therefrom shall be governed by and construed in accordance with the internal and domestic laws of the State of WASHINGTON without giving effect to the conflict of laws rules thereof. The Superior Court of Washington for Whatcom County and U.S. District Court for the Western District of Washington ("the U.S. Closed Courts") shall have exclusive jurisdiction to entertain and determine all disputes and claims, whether for specific performance, injunction, declaration or otherwise arising out of or in any way connected with the construction, breach, or alleged, threatened or anticipated breach of the contract resulting from this offer and shall have jurisdiction to hear and determine all questions as to the validity, existence or enforceability thereof. Customer specifically consents to such Court's exercise of jurisdiction over it. The purchaser attorns to the exclusive jurisdictions of the jurisdiction of the U.S. Closed Courts, waives any obligation to venue in any action or proceeding regarding Seon Products and waives any objection that the U.S. Closed Courts are an inconvenient forum or do not have jurisdiction over the purchaser of Seon. The United Nations Convention On Contracts For The International Sale Of Goods shall not apply.

Provisions Applicable to Canadian Customers

For those customers whose mailing address is in Canada, Seon's offer and any agreement of sale resulting therefrom shall be governed by and construed in accordance with the internal and domestic laws of the Province of BRITISH COLUMBIA and the laws of Canada applicable therein without giving effect to the conflict of laws rules thereof. The courts of British Columbia (the "Canadian Closed Courts") shall have exclusive jurisdiction to entertain and determine all disputes and claims, whether for specific performance, injunction, declaration or otherwise arising out of or in any way connected with the construction, breach, or alleged, threatened or anticipated breach of the contract resulting from this offer and shall have jurisdiction to hear and determine all questions as to the validity, existence or enforceability thereof. The purchaser attorns to the exclusive jurisdictions of the jurisdiction of the Canadian Closed Courts, waives any obligation to venue in any action or proceeding regarding Seon Products and waives any objection that the Canadian Closed Courts are an inconvenient forum or do not have jurisdiction over the purchaser of Seon. The United Nations Convention On Contracts For The International Sale Of Goods shall not apply.

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